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petal-bearing flowers were as perfectly fertilized in the unexpanded corollas as were the cleistogene flowers. But he was prepared to expect different results elsewhere.

SEPTEMBER 28.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty-four persons present.

The following papers were presented for publication in the Journal:

"The Parasites of the Termites," by Jos. Leidy, M. D.

"Remarks on *Bathynathus borealis*," by Jos. Leidy, M. D.

OCTOBER 5.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty-two persons present.

The death of James C. Fisher, M. D., a member, was announced.

Sexual Variation in Castanea Americana, Michx.—ISAAC C. MARTINDALE stated he had recently visited Pitman Grove, Gloucester Co., New Jersey, in order to examine some chestnut trees growing there, and remarked that it was well known there are but two species of chestnut trees in this country, the chinquapin, *Castanea pumila*, found occasionally in New Jersey, and abundantly further south, and the common chestnut, *Castanea Americana*. The chinquapin attains the height here of ten to twelve feet, being a shrub rather than a tree. In Maryland, Virginia and North Carolina, it often reaches four times that height, and becomes nearly a foot in diameter. It is from those States that most of the chinquapins found in our markets come. The burs contain but a single nut, and it quite small, but as a cluster of five or six together is not unfrequent, nearly as many chinquapins may be found on a branch, as chestnuts on the common chestnut trees. The leaves of the dwarf chestnut, as it is sometimes called, are woolly underneath, even in their mature condition, while on the other they become green on both sides as they reach full size.

A peculiar feature in the flowering of the chestnut, namely, that the trees bear two sets of flowers, was pointed out by Thomas Meehan, of the *Gardener's Monthly*, a close observer of vegetable growths, more than a year ago. His observations are recorded in the Proceedings of the Academy of Natural Sciences of Philadelphia, for the year 1879. It may not be difficult for any one to recall the manner of the inflorescence, which consists of the

flowers growing on a stem, botanically called a spike, from four to six inches in length, there being from thirty to sixty flowers together. These come from buds in the axils of the first leaves of the season, and are composed entirely of staminate (male) flowers. They are very odorous when in full bloom, and often so abundant as to give the trees a white appearance when seen at a distance. As soon as these flowers fade, which is in a few days, a disarticulation takes place close to the branch, and the spike falls to the ground. About ten days later, a second flowering takes place, these spikes coming from the later axillary buds of the season, and instead of being all staminate as in the first instance, at the base of the spike will be found one, sometimes two, rarely more, pistillate (female) flowers. These are fertilized by the staminate flowers that are in blossom at the same time; the staminate part of the spike falls away after flowering, but the pistillate part remains attached to the branch, and develops into a bur, containing from two to five or six nuts. What may be the use of the first set of blossoms, has not yet dawned upon the mind of man; it would seem a great waste of energy to provide for such an abundance without a purpose, but the prodigality of nature is visible in numerous other instances as well.

The variety of forms of the nut was greater in the locality referred to than he had ever seen before. One tree was particularly attractive, the shape of the bur being exactly pyriform instead of globular; its chestnuts, of course, corresponding somewhat in shape, being long and slim.

Near the southern line of the tract was found one tree, and afterwards in another part a second tree, which will require special notice. The former was about twenty feet high and six inches in diameter, while the other was at least seventy-five feet in height, and more than two feet in diameter at the base, a very wide spreading and thrifty looking tree. In these, the later blossoms referred to, instead of being part staminate and part pistillate, have been all pistillate, consequently were succeeded by burs all along the spike, numbering in those counted from fifty to sixty together, and hanging from the branches like bunches of grapes. Every branch of the tree that bore any at all, had them of this character, so that there were doubtless hundreds if not thousands of them. An important point is here manifested. These flowers being all pistillate, and the staminate ones (the first blossoms referred to) having fallen, there was nothing to fertilize them, consequently they could not attain much size nor develop chestnuts within the bur, except that rarely the first or second nearest the base contained three or four very small nuts. These nuts, however, were without germs.

He had been unable to find any record of such an occurrence in this country before, but Dr. Masters records it as having been noted in France. The superintendent of the grove to whom belongs the credit of first detecting these trees, could not say

whether in past years they had borne burs in this manner or not.

It will be remembered that occasionally in a field of corn the tassel, which is the staminate (male) flower, has a number of grains of corn intermixed. These grains come from pistillate (female) flowers, occurring among the staminate ones; thus it may be observed that our chestnut tree is not the only instance of deviation from the regular laws of development. It has been argued that a want of nutrition will account for this and similar instances, but the healthy appearance and vigorous growth of the trees in question is not such that a lack of nutrition can well apply.

Mr. THOMAS MEEHAN remarked that he believed instances of the changes of flowers normally of one sex to the other, were occasionally met with, though he could not refer to many without further thought or investigation, but it occurred to him just then that it was not unusual for some normally male spikes in *Carex* to have female flowers among them. He had himself seen well developed ovariums among the aments of *Populus alba*, and the case of female flowers among the male catkins of willows, was well known to teratologists. Reference had been made to his papers on sex as influenced by nutrition. His view of sex, as well known, was that in the earlier stages, between the cessation of vegetative growth and reproductive growth, a vegetable cell might be either male or female, and that the power of that cell to assimilate nutrition, involved the question of sex. If a full supply was received, the female form resulted; if limited, the male was produced. In most cases this assimilative power influenced only the branches or cells in the immediate vicinity of the flowers. There might be no difference in the cells of the whole plant in a general way to avail themselves of a full supply of nutrition. He did not know that there was greater vegetative strength in the plant of Maize, which bore some females among the "tassels" or males, than there was in the normal plant. There certainly was no difference in the vegetative strength of plants of separate sexes in many classes of plants. But there were instances which proved that the whole individual plant was influenced by laws of nutrition when the question of sex was involved. The female Hemp, the female Spinage, the female Croton, when the plants were wholly bi-sexual, were cases he could readily call to mind where vegetative vigor favored the whole plant.

The common *Ambrosia artemisiæfolia*, which often grows so thickly over cultivated fields as to appear as a regular farm crop, each plant fighting for nutrition with its neighbor, produces almost wholly male blossoms; the few females are found at the base of the male spikes. But when we go to the maize or the potato fields, where the plants are few and well fed, we may any

time find plants which have a great abundance of female flowers,—indeed, sometimes plants which are wholly female.

In the case of these chestnuts he would not say it was a want of nutrition which made these normally male flowers become female. That was not his view of the case. On the contrary, it was that better nutritive advantages prevailed to influence the female sex, and these long spikes of chestnut fruit proved the fact rather than interposed an objection. It was a simple and uncontroverted fact that these young chestnuts were being nourished, were imbibing nutrition, while if they had been normal male flowers, they would have been dead months ago. It was evident to the senses that nutrition was in the end involved, and we only had to consider at what point of early cell life its influence was felt. The old idea would probably be that the question of nutrition followed the “fiat” which made sex, while his views deduced from the numerous facts he had published on the question, were that nutrition, in its various phases, was itself the law-maker. As to the greater power behind this, which decreed that this should be the law, and that the law should produce such even divisions in the proportion of the sexes, it was another question. He only claimed that his discoveries had brought us a step nearer to this greater cause.

NOTE.—I have since learned through an old resident in the vicinity, that the large tree has borne such burs for many years, and that it is known throughout the neighborhood as the “he” tree.—I. C. M.

OCTOBER 12.

The President, Dr. RUSCHENBERGER, in the chair.

Thirty-five persons present.

OCTOBER 19.

Dr. R. S. KENDERDINE in the chair.

Twenty-eight persons present.

The Publication Committee reported in favor of publishing the following papers in the Journal of the Academy:—

“The Parasites of the Termites,” by Jos. Leidy, M. D.

“Remarks on *Bathynathus orientalis*,” by Jos. Leidy, M. D.